MANUAL PART NO.
MEP7201A-0

RC OSCILLATOR
VP-7201A

PC OSCILLATOR
VP-7207A

GENERAL

The VP-7201A RC oscillator generates the audio signal in frequencies from 5 Hz to 500 kHz in five ranges. For sine waveforms of audio frequencies from 20 Hz to 20 kHz, the low distortion factor of 0.005 percent or less and the flat frequency characteristics of ±0.2 dB or less are guaranteed.

In most measurements, this oscillator can be used without a level meter or an external attenuator because the output voltage is calibrated by dB (0 dB = 1 Vrms) in 0.1 dB increments from -69.9 dB to 10 dB (3.16 Vrms). Square waveforms are also output through the attenuator.

The oscillator has a two-step dial for rough and fine frequency control, pushbuttons for range selection and the easy operable step attenuator. This compact and light weight instrument with the width of only 142 mm is very useful for R&D laboratories, factories, and field service of various electronic equipment as a signal source for high performance audio instruments.

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SPECIFICATIONS

Frequency range	5 ranges: 5 Hz to 500 kHz
	x1: 5 to 50 Hz
	x10: 50 to 500 Hz
	x100: 500 Hz to 5 kHz
	x1k: 5 to 50 kHz
	x10k: 50 to 500 kHz
Frequency accuracy	Within ±(3% + 1 Hz)
Output voltage	
Maximum output	10 dB ± 1 dB
Range	-69.9 dB to 10 dB (0 dB = 1 Vrms, open circuit)

Output frequency characteristics (1 kHz reference)	Within ±0.2 dB for 5 Hz to 20 kHz Within ±0.5 dB for 20 kHz to 500 kHz
Distortion factor	0.005% or less for 20 Hz to 20 kHz 0.01% or less for 10 Hz to 50 kHz (except for 50 kHz in the x10k range) 0.1% or less for 5 Hz to 500 kHz
Output impedance	600Ω, unbalanced
Output attenuators	Seven 10-dB, nine 1-dB, and nine 0.1-dB
Square waveform output (600Ω load)	
Output voltage	4 Vp-p or more
Waveform characteristics (-30 dB or more output)	
Rise time	200 nsec or less
Sag	5% or less
Overshoot	5% or less

Output frequency characteristics (1 kHz reference)	Within ±0.2 dB for 5 Hz to 20 kHz Within ±0.5 dB for 20 kHz to 500 kHz
Distortion factor	0.005% or less for 20 Hz to 20 kHz 0.01% or less for 10 Hz to 50 kHz (except for 50 kHz in the 5 Hz range) 0.1% or less for 5 Hz to 500 kHz
Output impedance	600Ω, unbalanced
Output attenuators	Seven 10-dB, nine 1-dB, and nine 0.1-dB
Square waveform output (600Ω load)	
Output voltage	4 Vp-p or more
Waveform characteristics (-30 dB or more output)	
Rise time	200 nsec or less
Sag	5% or less
Overshoot	5% or less

OPERATING PROCEDURE

Note: This instrument operates from ±10% of the nominal line voltage at 50 or 60 Hz.

Observe the following:

1. How to select the sine or square waveform output.

   Press the WAVEFORM switch to output square waveforms; release it to output sine waveforms.

2. How to set the frequency.

   To set a frequency within 5 Hz to 500 kHz, use one frequency range select button and the frequency dial.

   (Example 1) To set 10 kHz

   (1) Press the x1k range select button.

   (2) Set the pointer of the frequency dial to 10.

The inner and outer controls of the frequency dial are used for coarse and fine adjustment, respectively. The reduction ratio is one to six.

Note

The dial scale ranges from 5 to 50, and rotates continuously and endlessly over the non graduated area. Quickly turn the dial while the pointer stays in the nongraduated area, because the longer the pointer stays out of range, the longer it takes for the output waveforms or amplitudes to stabilize. Also, when the pointer is in the nongraduated area, the oscillator produces no signal.

3. How to set the output

The output voltage of the VP-7201A uses 1 Vrms (open-circuit voltage) as the reference (0 dB). The voltage can vary from -69.9 to +10 dB (1 mVrms to 3.16 Vrms) with attenuators of seven 10-dB, nine 1-dB and nine 0.1-dB increments.

Table 1 Voltage for different dBs

dB	Open-circuit voltage	600Ω load
+10 dB	3.16 Vrms	1.58 Vrms
0 "	1.0 "	0.5 "
-10 "	316 mVrms	158 mVrms
-20 "	100 "	50 "
-30 "	31.6 "	15.8 "
-40 "	10.0 "	5.0 "
-50 "	3.16 "	1.58 "
-60 "	1.0 "	0.5 "

* In Table 1, the dB values are true when both the 1 dB and 0.1 dB step attenuators are set to 0 dB.

Table 2 lists the attenuated voltages as a percentage when 0 dB is referred to 100%.

Table 2 Voltage as percent of 0 dB

dB	%
0 dB	100 %
1 "	89.1 "
2 "	79.4 "
3 "	70.8 "
4 "	63.1 "
5 "	56.2 "
6 "	50.1 "
7 "	44.7 "
8 "	39.8 "
9 "	35.5 "

dB	%
0 dB	100 %
0.1 "	98.9 "
0.2 "	97.7 "
0.3 "	96.6 "
0.4 "	95.5 "
0.5 "	94.4 "
0.6 "	93.3 "
0.7 "	92.3 "
0.8 "	91.2 "
0.9 "	90.2 "

(Example 2) The open-circuit voltage for -47 dB is obtained as follows:

From Tables 1 and 2,

$$10 \text{ mV} \times \frac{44.7}{100} = 4.47 \text{ mV}$$

(Example 3) The open-circuit voltage for -32.4 dB is:

From Tables 1 and 2,

$$31.6 \text{ mV} \times \frac{79.4}{100} \times \frac{92.3}{100} = 23.2 \text{ mV}$$

For square waveforms

The maximum output for square waveforms is approximately 5 Vp-p. In this case, set the attenuator to +10 dB. The amplitude of the square waveform changes from 0 to positive.

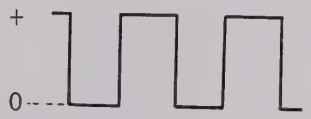


Fig. 1 Square waveform output

Table 3 Voltage for dB

dB	Open-circuit voltage	600Ω load
+10 dB	5 Vp-p	2.5 Vp-p
0 "	1.58 "	0.79 "
-10 "	500 mVp-p	250 mVp-p
-20 "	158 "	79 "
-30 "	50 "	25 "
-40 "	15.8 "	7.9 "
-50 "	5.0 "	2.5 "
-60 "	1.58 "	0.79 "

Table 3 lists the output voltages of square waveforms for dB values. For the 1 dB and 0.1 dB step attenuators, see Table 2.

Note

Carefully select the cable used for the output connector because some cables cause poor frequency characteristics for sine waveforms and poor leading edge characteristics for square waveforms.

Note

Never apply an external voltage of 10 V or more (peak value of AC and DC) to the output connector. It will damage the instrument.

MAINTENANCE

1. Don't use volatile solvents, such as thinner and benzine. Clean the panel or case with a dry, soft cloth or with a cloth slightly dampened with a neutral detergent.

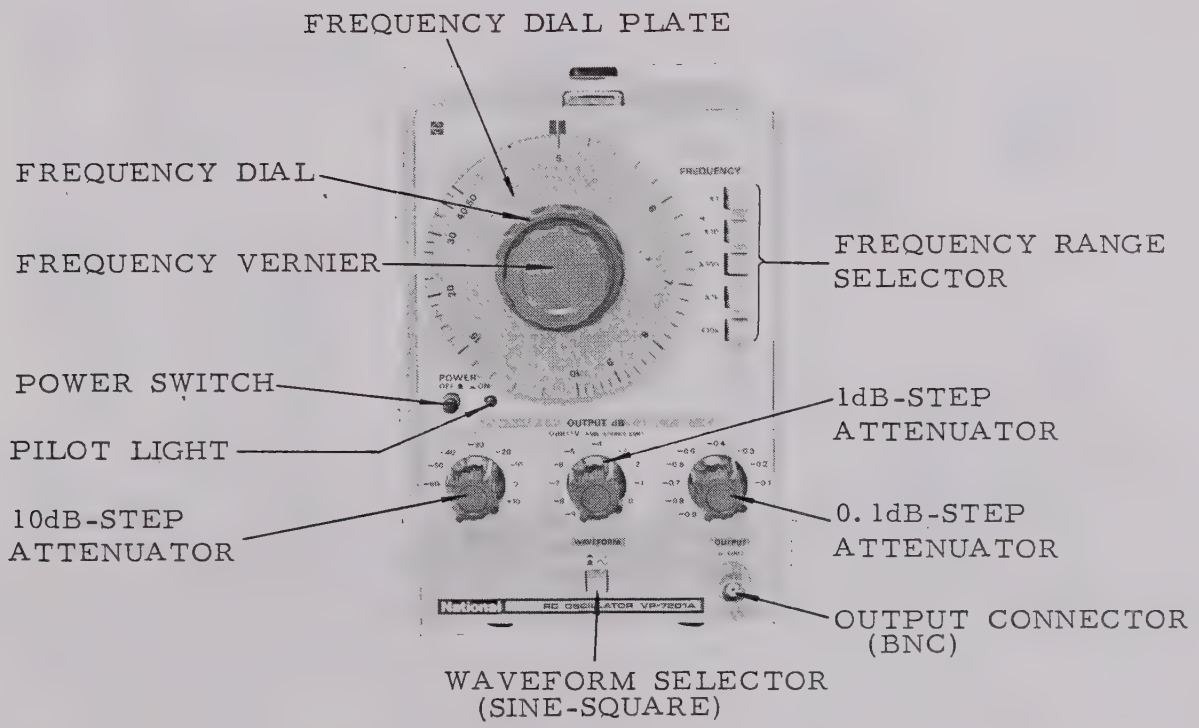
2. The 0.2 A power fuse is soldered to the terminal of the transformer in the instrument. Replace the fuse only with the accessory fuse. Before replacing it, remove the cover as follows:

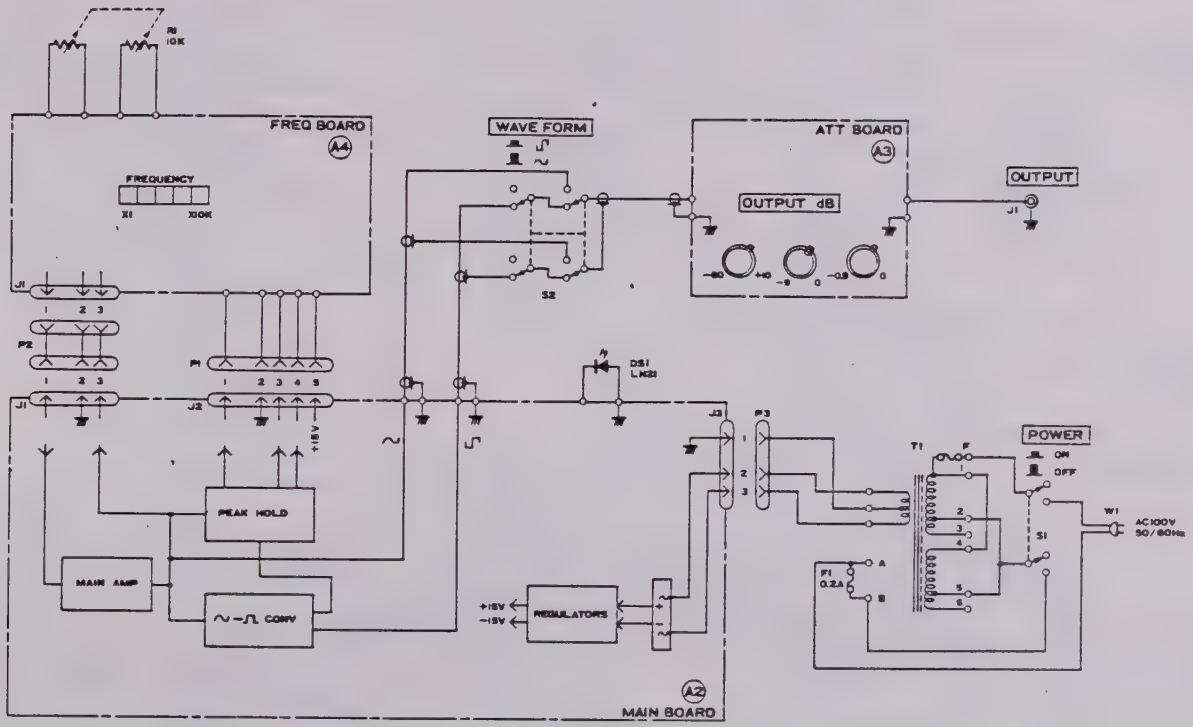
   (1) Remove the eight screws from the side and bottom panels of the instrument. (Don't remove any other screws.)

   (2) Pull the cover backward to remove it.

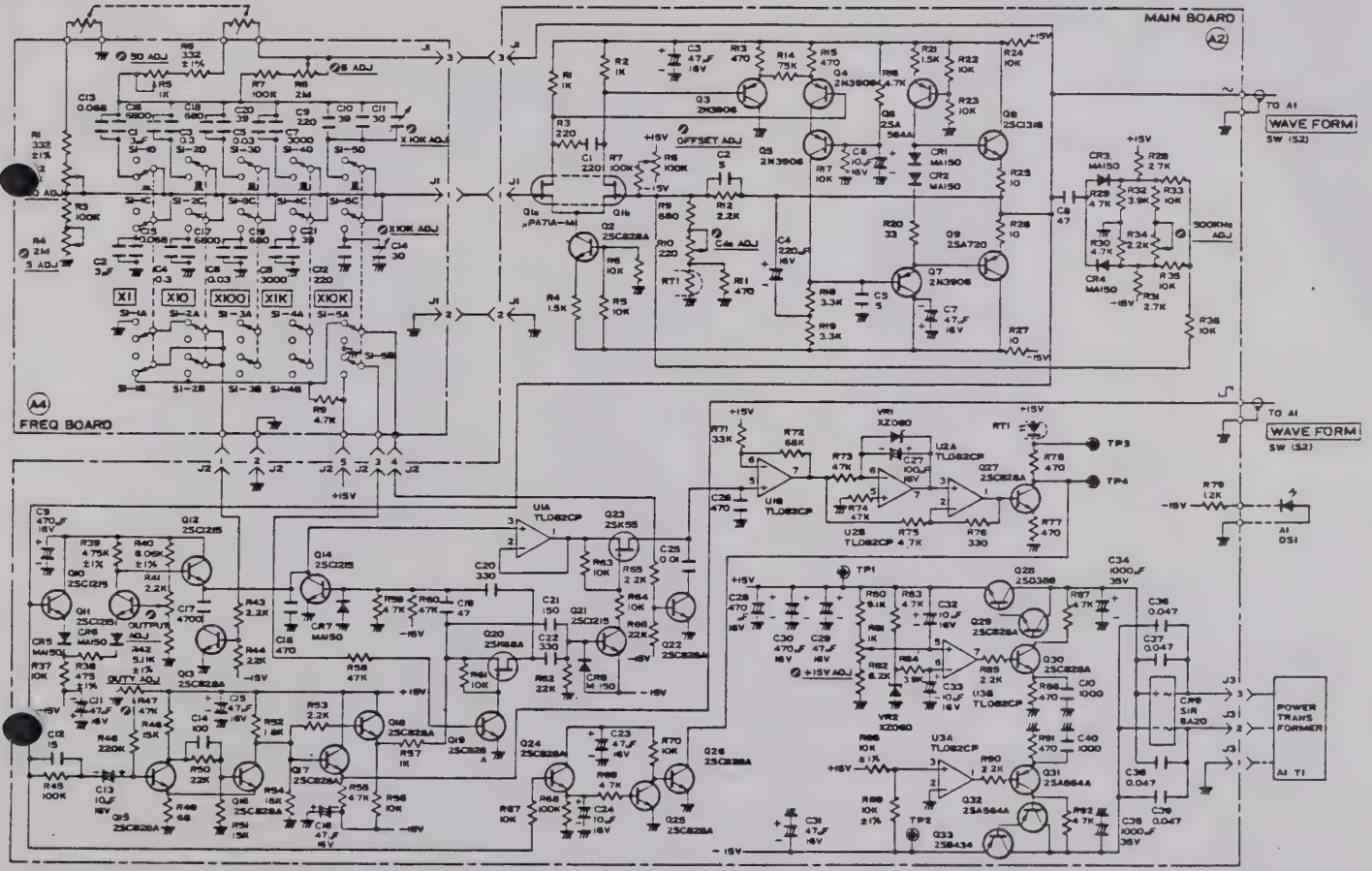
   Contact your service agent if you need more fuses.

FRONT PANEL FEATURES

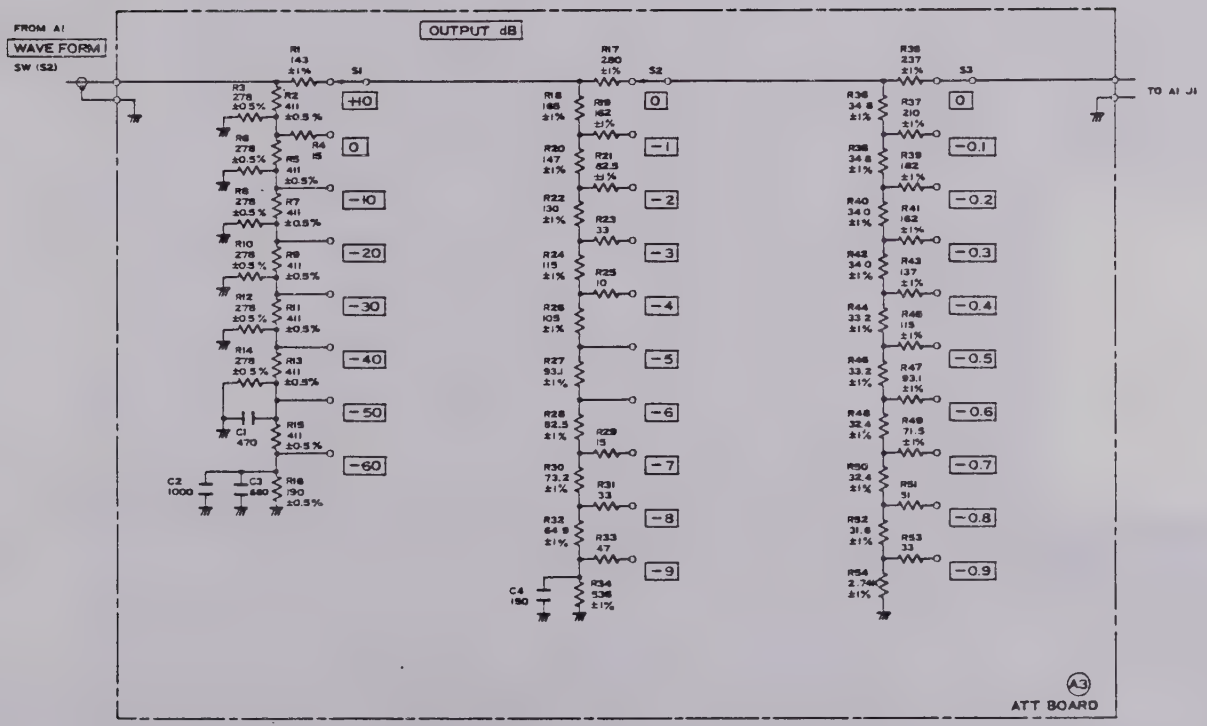




OVERALL INTERCONNECTION (A1)



MAIN BOARD (A2) FREQ BOARD (A4)


FROM A1
WAVE FORM
SW (S2)
OUTPUT dB
R1 143 ±1%
S1
+10
0
-10
-20
-30
-40
-50
-60
R3 278 ±0.5%
R2 411 ±0.5%
R6 278 ±0.5%
R4 15
R5 411 ±0.5%
R8 278 ±0.5%
R7 411 ±0.5%
R10 278 ±0.5%
R9 411 ±0.5%
R12 278 ±0.5%
R11 411 ±0.5%
R14 278 ±0.5%
R13 411 ±0.5%
C1 470
R15 411 ±0.5%
C2 1000
C3 680
R16 190 ±0.5%
R17 280 ±1%
S2
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
R18 185 ±1%
R19 162 ±1%
R20 147 ±1%
R21 82.5 ±1%
R22 130 ±1%
R23 33
R24 115 ±1%
R25 10
R26 105 ±1%
R27 93.1 ±1%
R28 82.5 ±1%
R29 15
R30 73.2 ±1%
R31 33
R32 64.9 ±1%
R33 47
C4 150
R34 536 ±1%
R36 237 ±1%
S3
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
-0.9
R36 34.8 ±1%
R37 210 ±1%
R38 34.8 ±1%
R39 182 ±1%
R40 34.0 ±1%
R41 162 ±1%
R42 34.0 ±1%
R43 137 ±1%
R44 33.2 ±1%
R46 115 ±1%
R46 33.2 ±1%
R47 93.1 ±1%
R48 32.4 ±1%
R49 71.5 ±1%
R50 32.4 ±1%
R51 51
R52 31.6 ±1%
R53 33
R54 2.74K ±1%
TO A1 J1
A3
ATT BOARD

GENERAL

The VP-7201A RC oscillator generates the audio signal in frequencies from 5 Hz to 500 kHz in five ranges. For sine waveforms of audio frequencies from 20 Hz to 20 kHz, the low distortion factor of 0.005 percent or less and the flat frequency characteristics of ±0.2 dB or less are guaranteed.

In most measurements, this oscillator can be used without a level meter or an external attenuator because the output voltage is calibrated by dB (0 dB = 1 Vrms) in 0.1 dB increments from -69.9 dB to 10 dB (3.16 Vrms). Square waveforms are also output through the attenuator.

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Frequency accuracy	Within ±(3% + 1 Hz)
Output voltage	
Maximum output	10 dB ± 1 dB
Range	-69.9 dB to 10 dB
	(0 dB = 1 Vrms, open circuit)

Output frequency characteristics (1 kHz reference)	Within ±0.2 dB for 5 Hz to 20 kHz Within ±0.5 dB for 20 kHz to 500 kHz
Distortion factor	0.005% or less for 20 Hz to 20 kHz 0.01% or less for 10 Hz to 50 kHz (except for 50 kHz in the x10k range) 0.1% or less for 5 Hz to 500 kHz
Output impedance	600Ω, unbalanced
Output attenuators	Seven 10-dB, nine 1-dB, and nine 0.1-dB

Square waveform output (600Ω load)

Output voltage	4 Vp-p or more
Waveform characteristics (-30 dB or more output)	
Rise time	200 nsec or less
Sag	5% or less
Overshoot	5% or less

OPERATING PROCEDURE

Note: This instrument operates from ±10% of the nominal line voltage at 50 or 60 Hz.

Observe the following:

1. How to select the sine or square waveform output.

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Table 2 lists the attenuated voltages as a percentage when 0 dB is referred to 100%.

Table 2 Voltage as percent of 0 dB

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2 "	79.4 "
3 "	70.8 "
4 "	63.1 "
5 "	56.2 "
6 "	50.1 "
7 "	44.7 "
8 "	39.8 "
9 "	35.5 "

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0.2 "	97.7 "
0.3 "	96.6 "
0.4 "	95.5 "
0.5 "	94.4 "
0.6 "	93.3 "
0.7 "	92.3 "
0.8 "	91.2 "
0.9 "	90.2 "

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For square waveforms

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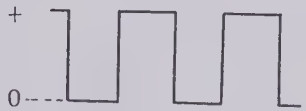

Fig. 1 Square waveform output

Table 3 Voltage for dB

dB	Open-circuit voltage	600Ω load
+10 dB	5 Vp-p	2.5 Vp-p
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Table 3 lists the output voltages of square waveforms for dB values. For the 1 dB and 0.1 dB step attenuators, see Table 2.

Note

Carefully select the cable used for the output connector because some cables cause poor frequency characteristics for sine waveforms and poor leading edge characteristics for square waveforms.

Note

Never apply an external voltage of 10 V or more (peak value of AC and DC) to the output connector. It will damage the instrument.

MAINTENANCE

1. Don't use volatile solvents, such as thinner and benzine. Clean the panel or case with a dry, soft cloth or with a cloth slightly dampened with a neutral detergent.

2. The 0.2 A power fuse is soldered to the terminal of the transformer in the instrument. Replace the fuse only with the accessory fuse. Before replacing it, remove the cover as follows:

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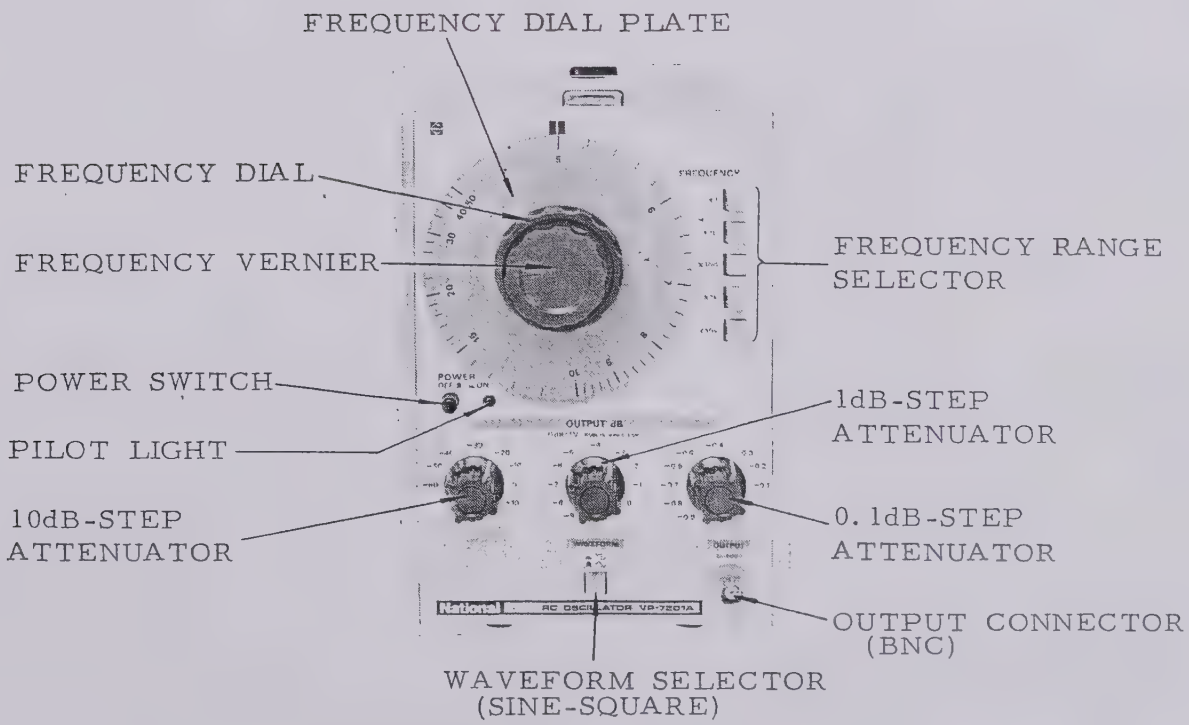
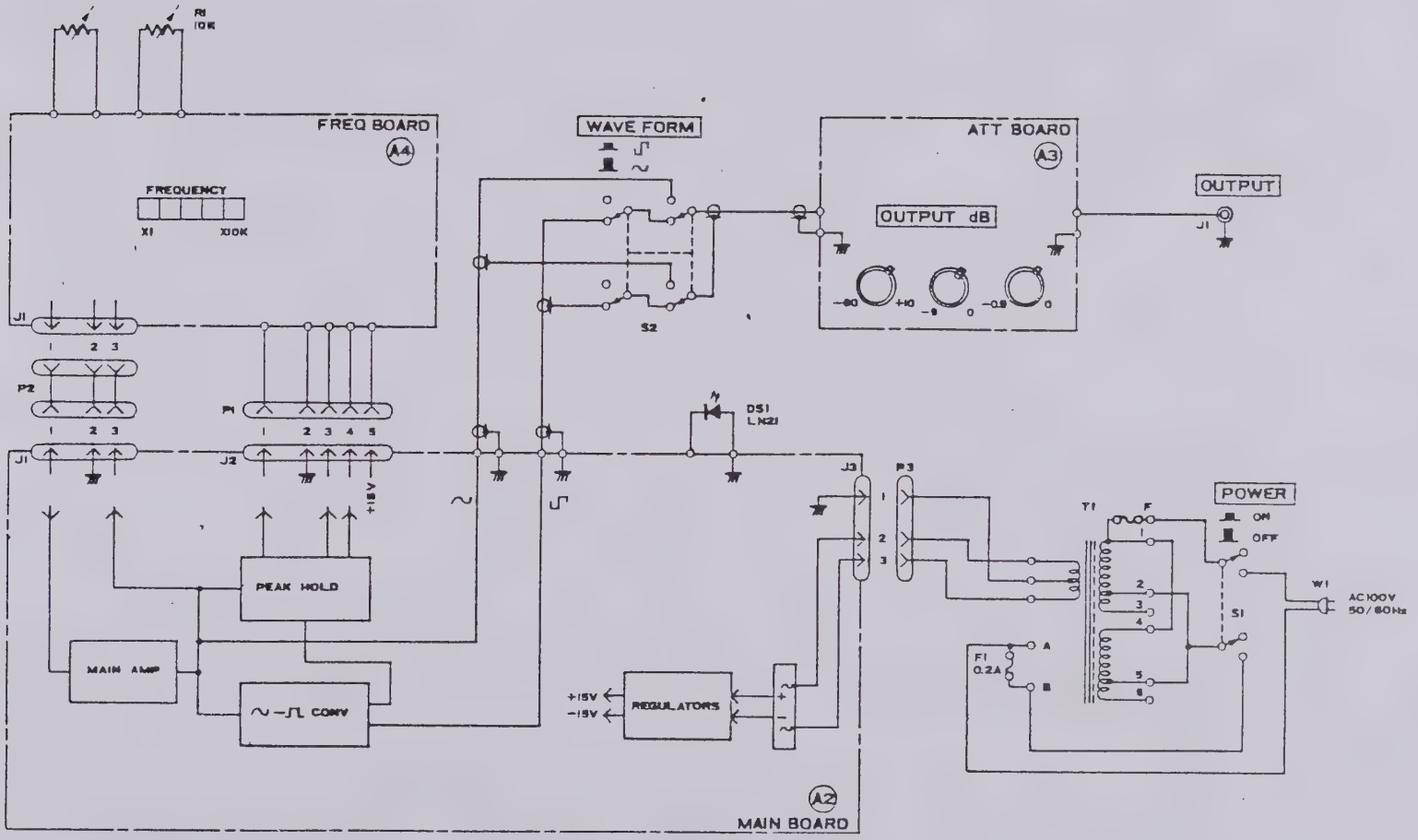
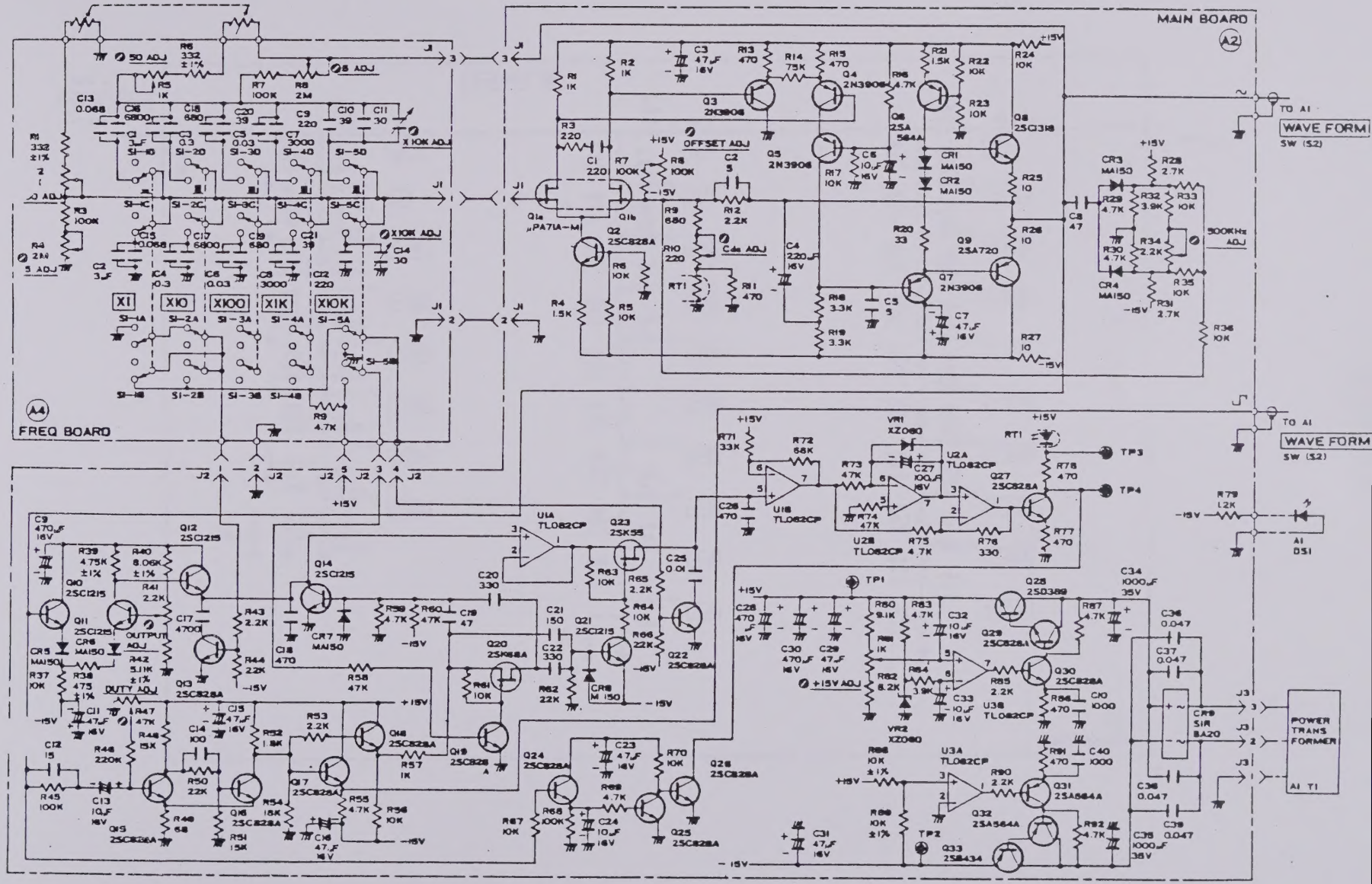
   Contact your service agent if you need more fuses.

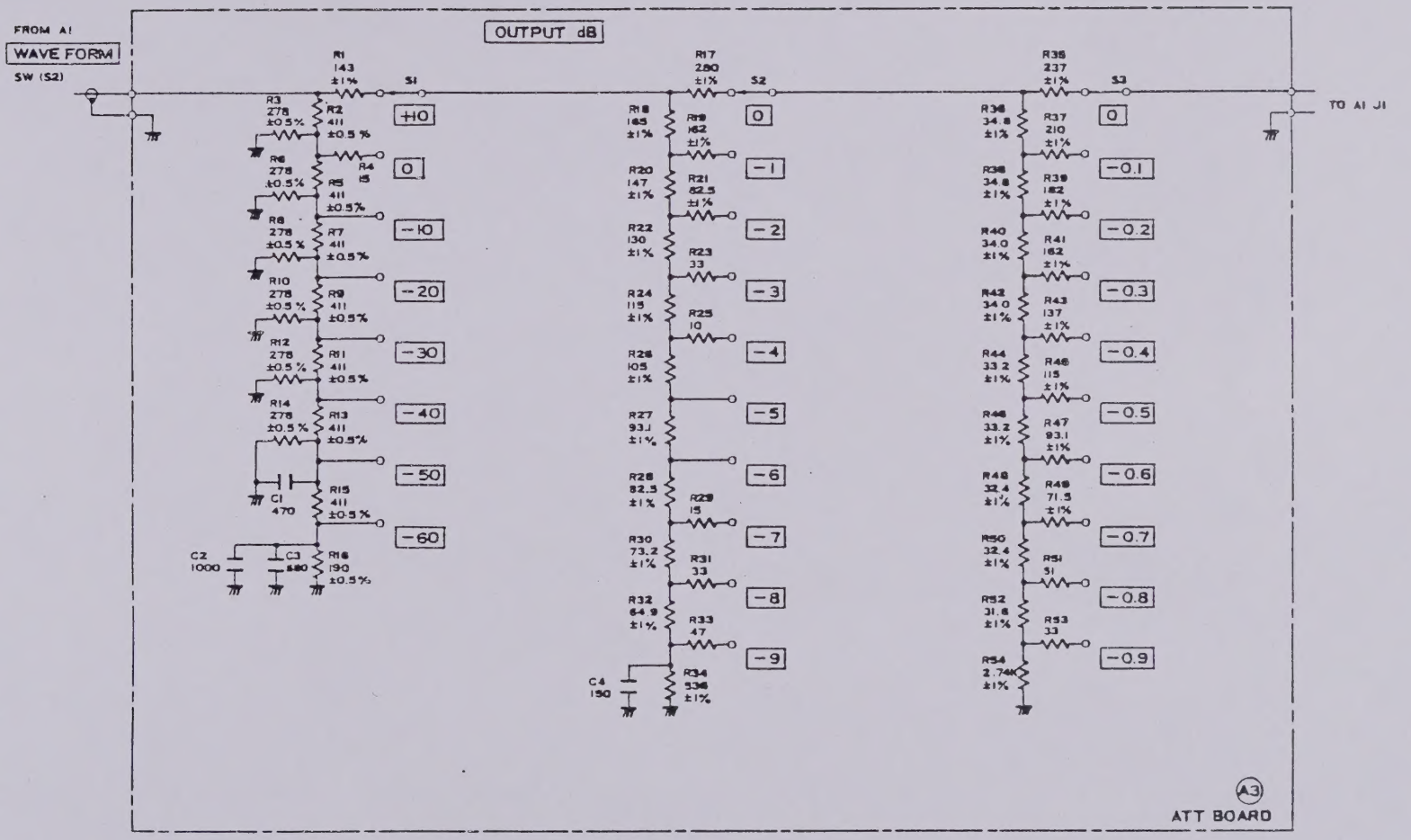
FRONT PANEL FEATURES





OVERALL INTERCONNECTION (A1)


MAIN BOARD
A2
FREQ BOARD
A4
TO A1 WAVE FORM SW (S2)
TO A1 WAVE FORM SW (S2)
POWER TRANS FORMER
A1 T1
A1 DS1
50 ADJ
8 ADJ
X10K ADJ
OFFSET ADJ
500KHz ADJ
OUTPUT ADJ
DUTY ADJ
+15V ADJ
X1
X10
X100
X1K
X10K
+15V
-15V


FROM A1
WAVE FORM
SW (S2)
OUTPUT dB
R1 143 ±1%
S1
+10
0
-10
-20
-30
-40
-50
-60
R2 411 ±0.5%
R3 278 ±0.5%
R4 15
R5 411 ±0.5%
R6 278 ±0.5%
R7 411 ±0.5%
R8 278 ±0.5%
R9 411 ±0.5%
R10 278 ±0.5%
R11 411 ±0.5%
R12 278 ±0.5%
R13 411 ±0.5%
R14 278 ±0.5%
R15 411 ±0.5%
C1 470
C2 1000
C3 680
R16 190 ±0.5%
R17 280 ±1%
S2
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
R18 185 ±1%
R19 162 ±1%
R20 147 ±1%
R21 82.5 ±1%
R22 130 ±1%
R23 33
R24 115 ±1%
R25 10
R26 105 ±1%
R27 93.1 ±1%
R28 82.5 ±1%
R29 15
R30 73.2 ±1%
R31 33
R32 64.9 ±1%
R33 47
C4 150
R34 536 ±1%
R35 237 ±1%
S3
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
-0.9
R36 34.8 ±1%
R37 210 ±1%
R38 34.8 ±1%
R39 182 ±1%
R40 34.0 ±1%
R41 162 ±1%
R42 34.0 ±1%
R43 137 ±1%
R44 33.2 ±1%
R46 115 ±1%
R46 33.2 ±1%
R47 93.1 ±1%
R48 32.4 ±1%
R49 71.5 ±1%
R50 32.4 ±1%
R51 51
R52 31.6 ±1%
R53 33
R54 2.74K ±1%
TO A1 J1
A3
ATT BOARD